

Cheung, Wendy

From: Pat O'Brien <pwob@comcast.net>
Sent: Thursday, July 27, 2017 4:46 PM
To: Cheung, Wendy
Cc: 'Clint Carter'; 'Chris Douglass'; 'Michelle Probasco'; 'Scott Niebur'
Subject: FW: DI-2 RAT survey, Basic Energy
Attachments: Hydro Resources, ECCV DI-2,071917 ASCII.xlsx; Hydro Resources, ECCV DI-2,071917 chart.pdf; Hydro Resources, ECCV DI-2,07191701UNIT70360TRTR.pdf

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Hello Wendy,

As we discussed, we completed the RAT survey on the ECCV DI-2 well on July 19, 2017. We used Basic Energy to provide the pumping equipment and the logging unit to measure flow and pressure into the well. The Basic Energy data are attached. In the XL file, Column B represent the pressure inside the tubing at the wellhead and Column F is the flow rate in BPM. Production logging ran the gamma and casing collar locator and injected/tracked the iodine 131 tracer fluid. The Production logging data will be sent separately.

We ran the test as specified in the EPA Radioactive Tracer Survey document. Essentially, prior to testing, we ran a gamma survey of the bottom portion of the well.

Also, we performed the injectivity profile that shows the percentage of fluid entering each set of perforations and to confirm no flow below the perforations.

The channel check was run by locating the gamma detector just above the uppermost perforations, injecting one radioactive slug, and monitoring the gamma log over a period of time. In order to document any radioactive fluid migrating up the annulus, we pumped this well at 37 to 37.5 BPM (while monitoring gamma) until we were positive there was no radioactive fluid migrating up the cemented annulus. The calculated wait time, per the EPA document, is 2.3 seconds. This is the time it takes for water inside the tubing to flow between the detector and the uppermost screen section multiplied by 3 (flow velocity of 40.2 ft/sec and a distance of 31 feet). To be extremely conservative, we ran the test much longer than 2.3 seconds (52 minutes) to be sure there was no vertical fluid migration.

The tool string was then run on depth drive and the interval between the tool and the perforations was logged. A post-tracer gamma, CCL log was also run.

The RAT testing showed no evidence of vertical migration of fluids upward through the cemented annulus or downward through the bottom of the well.

The channel check test was run at rates between 37 and 37.5 BPM with the maximum pressure of 3056 psi. Therefore we request a Maximum Allowable Injection Pressure at the wellhead of 3056 for this well.

The Production Logging logs will follow with additional details listed on the log.

Sincerely,

Patrick OBrien, PE, CPGS